

Claims

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1. Method for welding preformed tube-rounds (7, 7') into tubes (9), especially thin-walled tube-rounds with a tube diameter to material thickness ratio equal to or greater than 65, characterized in that to effect the initial positioning of the edges to be welded the individual tube-round is acted on at a plurality of points on its circumference simultaneously by pinching tools (14-20) that are individually susceptible to power-assisted adjustment essentially towards or away from the longitudinal axis of the tube-round so as to bring the longitudinal edges of the tube-round into contact with each other.
2. Method according to Claim 1, characterized in that during the initial positioning in the edge region a dressing tool (52) dips into the tube-round and forms at least one contact plane (52') for at least one of the edges, but preferably a contact plane for each of the two edges, and in that this dressing tool is gradually withdrawn from the tube-round.
3. Method according to Claim 2, characterized in that the withdrawal action of the dressing tool (52) is coupled with a motion of at least one of the pinching tools (14-20).
4. Method according to any one of Claims 1 to 3, characterized in that at least one magnetic tool (60, 61) is provided in the region of the edges of the tube-round.
5. Method according to Claim 1, characterized in that a plurality of sets (45, 46, 46) of pinching tools are provided along the length of the tube-round.
6. Method according to Claim 5, characterized in that the sets of pinching tools are adjustable in relation to one another in the longitudinal direction of the tube-round.

7. Method according to Claim 5, characterized in that the sets of pinching tools can be coupled to each other.

8. Method for welding preformed tube-rounds (7, 7') into tubes (9), especially thin-walled tube-rounds with a tube diameter to material thickness ratio equal to or greater than 65, characterized in that to position the edges of the tube-round at the welding tool (27) at least one driven adjustable element (30, 31; 32-35) is used to modify the position of the edges ahead of the welding tool in response to an edge position detection device (10).

9. Method according to Claim 8, characterized in that adjustable elements are formed by those rollers (30, 31) of a roller-ring (30-35) surrounding the tube-round which are located nearest to the edges.

10. Method according to Claim 8, characterized in that the elements are formed by segments of a roller-ring surrounding the tube-round which comprise a plurality of rollers (32, 33; 34, 35).

11. Method for welding preformed tube-rounds (7, 7') into tubes (9), especially thin-walled tube-rounds with a tube diameter to material thickness ratio equal to or greater than 65, characterized in that during welding the tube-round is internally supported on either side of its butting edges.

12. Machine for welding preformed tubes with a diameter to wall thickness ratio equal to or greater than 65, characterized by a modular construction with at least one - initial-centring module (3) and at least one - centring and welding module (4),

in which the modules are arranged on a common carrier unit (6) so as to be exchangeable and adjustable with respect to each other.

13. Machine according to Claim 12, characterized in that a lead-in module (2) is provided ahead of the initial-centring module.

14. Machine according to Claim 12 or 13, characterized in that modules can be coupled to each other and/or in that modules on the carrier unit (6, 6') can be transferred from the working position to a standby position and vice versa.

15. Initial-centring module (3) for a machine according to Claims 12 to 14, characterized in that it has a mounting (21, 22, 24) for a plurality of pinching tools (14-20) which form a lead-through opening and can be power-driven individually or in groups essentially towards the centre of the lead-through opening or away from it.

16. Initial-centring module according to Claim 15, characterized in that it has a dressing tool (52) which can be power-driven towards the centre or away from it and which has at least one stop face (52').

17. Initial-centring module according to Claim 16, characterized in that the drives of at least one pinching tool and of the dressing tool are coupled by a control device.

18. Initial-centring module characterized in that it has at least one magnetic tool (60, 61) which is arranged adjacent to the dressing tool (52).

19. Initial-centring module characterized in that it has coupling elements for coupling with other modules.

20. Centring and welding module (4) with at least one ring of roller-type tools (30-35) which form a lead-through, characterized in that at least one ring element (30, 31; 32-35) susceptible to power-assisted adjustment is provided.

21. Centring and welding module according to Claim 20, characterized in that the adjustable ring elements are provided in the form of two rollers (30, 31) located on either side of the welding beam (26) and adjustable so that the shape of the lead-through in the welding zone can be altered.

22. Centring and welding module according to Claim 20, characterized in that the adjustable ring elements are provided in the form of two segments of the ring (32, 33; 34, 35) tiltable about centres of rotation located on either side of the longitudinal axis of the welding beam.

23. Centring and welding module with at least one ring of roller-type tools which form a lead-through, characterized in that an internal support-rest is arranged inside the lead-through.